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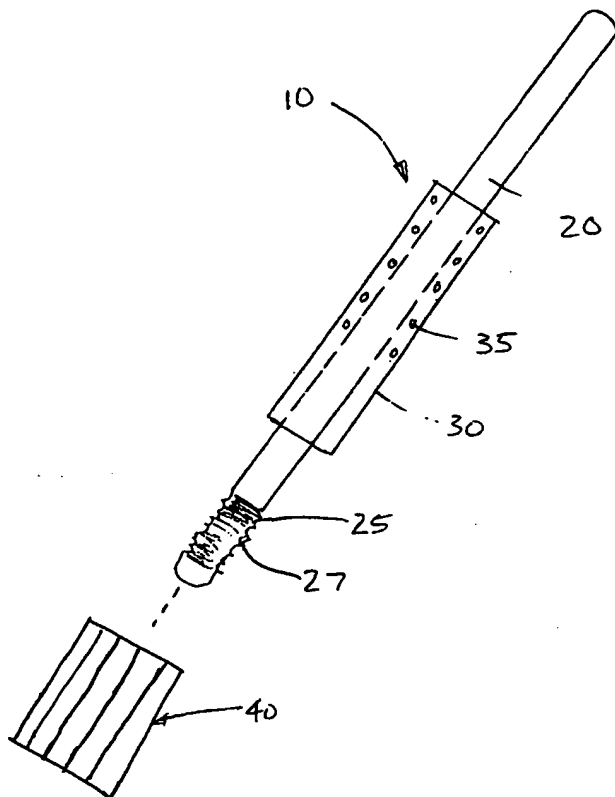
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[Continued on next page]

(54) Title: CLEANING BRUSH WITH DISPOSABLE HEAD



(57) Abstract: A cleaning device (10) having a disposable cleaning head (40) is provided. The device (10) includes an elongated handle (20) having a mounting stem (25). The cleaning head (40) is attached to the mounting stem (25). In addition, preferably, the device (10) includes an ejector (30) that is operable to eject the cleaning head off the handle (20) after use. The cleaning device (10) is particularly suited for use as a toilet brush. Specifically, the cleaning head (40) is dissolvable in liquid so that the cleaning head can be flushed after use.

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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

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**CLEANING BRUSH WITH DISPOSABLE HEAD****FIELD OF INVENTION**

The present invention relates to the field of cleaning devices. In particular, the present invention relates to cleaning devices having a replaceable head.

5 Specifically, the present invention relates to disposable head cleaning devices for cleaning liquid filled containers such as toilets, wherein the disposable head dissolves after use so that the cleaning head can be flushed.

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**DESCRIPTION OF THE DRAWINGS**

Fig. 1 is a side elevational view of a cleaning device embodying aspects of the present invention;

Fig. 2 is an enlarged perspective view of a  
15 disposable cleaning head for use with the cleaning device illustrated in Fig. 1; and

Fig. 3 is a perspective view of the cleaning device illustrated in Fig. 1, shown in combination with a container of disposable cleaning heads.

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**DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

Referring now to the drawings in general, and to Fig. 1 specifically, a cleaning device embodying aspects of the present invention is designated generally 10. The

cleaning device 10 includes a disposable cleaning head 40. The cleaning head 40 is dissolvable in liquid. Accordingly, the cleaning device is particularly suited for use as a toilet brush, wherein after use the  
5 disposable cleaning head 40 can be flushed.

The device 10 includes an elongated handle 20 having a mounting stem 25 onto which the cleaning head 40 is attached. Preferably, the device includes an ejector 30  
10 in the form of an elongated sleeve co-axial with the handle 20. The ejector 30 is operable to eject the cleaning head 40 off of the handle 20 after use.

The handle 20 may be formed in one of a number of  
15 configurations, to adapt the cleaning device to various applications. In the present instance the handle is an elongated cylindrical handle. The mounting stem 25 is formed on the distal end of the handle. In the present instance, the mounting stem 25 comprises a plurality of  
20 axially spaced ribs 27 extending around the circumference of the handle.

The cleaning head 40 preferably comprises a  
cylindrical core 42 and an outer cleaning layer 44 that  
25 surrounds the core, which is comprised of a plurality of soluble fibers attached to the exterior of the core. The

interior core is configured to cooperate with the mounting stem 25 of the handle 20. In the present instance, the interior of the core is cylindrical having a diameter that corresponds to the exterior diameter of the mounting stem. More specifically, preferably the core is semi-rigid having a diameter that is smaller than the outer diameter of the ribs 27 of the mounting stem 25. In this way, when the mounting stem 25 is inserted into the core 42, the core deforms outwardly to fit over the ribs 27. The ribs are formed so that they engage the interior of the core 42 and operate as a lock, impeding removal of the cleaning head 40 from the mounting stem 25. The fit between the core and the mounting stem is an interference fit. In addition, the core has sufficient resilience so that after being pressed onto the mounting stem, the diameter resiliently expands into engagement with the ribs 27. In this way, the ribs form ratchet teeth having sufficient rigidity to provide effective engagement with the cleaning head to resist disengagement of the head from the handle.

The cleaning layer 44 attached to the core is formed of a water-soluble material. Prior to use, the cleaning layer is dry and is substantially rigid. Upon contact with water, the cleaning absorbs and retains water, so that the cleaning layer expands and is sufficiently pliable for use for cleaning. In addition, preferably

the cleaning layer is imbedded with a cleaning material and fragrance.

Preferably, the cleaning layer 44 is formed of a material that maintains its integrity while submersed in water for a sufficient period of time to allow the device to be used as a cleaning device. However, the cleaning layer is sufficiently soluble in water so that after several minutes, the cleaning layer disintegrates, thereby allowing the cleaning head to be flushed.

Similarly, preferably, the core 42 is also formed of a material that maintains its integrity in water during use and then is sufficiently soluble in water to disintegrate so that the cleaning head can be flushed. Further, preferably the core dissolves more rapidly than the outer cleaning layer. In this way, the inner core softens and dissolves so that the cleaning head readily disengages the mounting stem. However, in certain applications, it may be desirable to utilize a core that dissolves at a slower rate than the cleaning head.

The core 42 and cleaning layer 4 may be formed of any of a number of water-soluble biodegradable materials. For instance, the core and cleaning head can be formed of one or more of the following materials: cellulose material, paper pulp, lignin, and vegetable oil.

The ejector 30 is operable to eject the cleaning head 40 from the mounting stem 25. The ejector is an

elongated cylindrical sleeve that is coaxial with the handle 20. If the user desires to remove the cleaning head from the handle after use, the user displaces the ejector forwardly so that the forward edge of the ejector engages the cleaning head. Continued forward  
5 displacement of the ejector displaces the cleaning head forwardly until the cleaning head disengages the mounting stem 25. Preferably, the ejector 30 is biased rearwardly by a spring so that after the user advances the sleeve,  
10 the spring biases the ejector sleeve rearwardly so that the ejector sleeve returns to its retracted position.

The ejector allows the user to eject the cleaning head after the cleaning head had softened and become pliable, but has not sufficiently dissolved for the core  
15 to disengage the mounting stem without force. In other words, the user may use the device until the cleaning head sufficiently dissolves and disengages the handle. However, if the user is done cleaning before the cleaning head has sufficiently dissolved, the user may eject the  
20 cleaning head using the ejector, without waiting for the cleaning head to disintegrate and fall off the handle.

Referring to Fig. 3, the cleaning heads 40 may be packaged in a refill pack 50. The refill pack is a carton having a plurality of pockets for receiving the  
25 cleaning heads 40. Each pocket receives one of the cleaning heads. To mount a cleaning head onto the

handle, the handle is inserted into the cleaning head 40 while the cleaning head is disposed in the pocket in the refill container 50.

5       The terms and expressions which have been employed are used as terms of description and not of limitation. There is no intention in the use of such terms and expressions of excluding any equivalents of the features shown and described or portions thereof. It is recognized, however, that various modifications are  
10       possible within the scope and spirit of the invention.



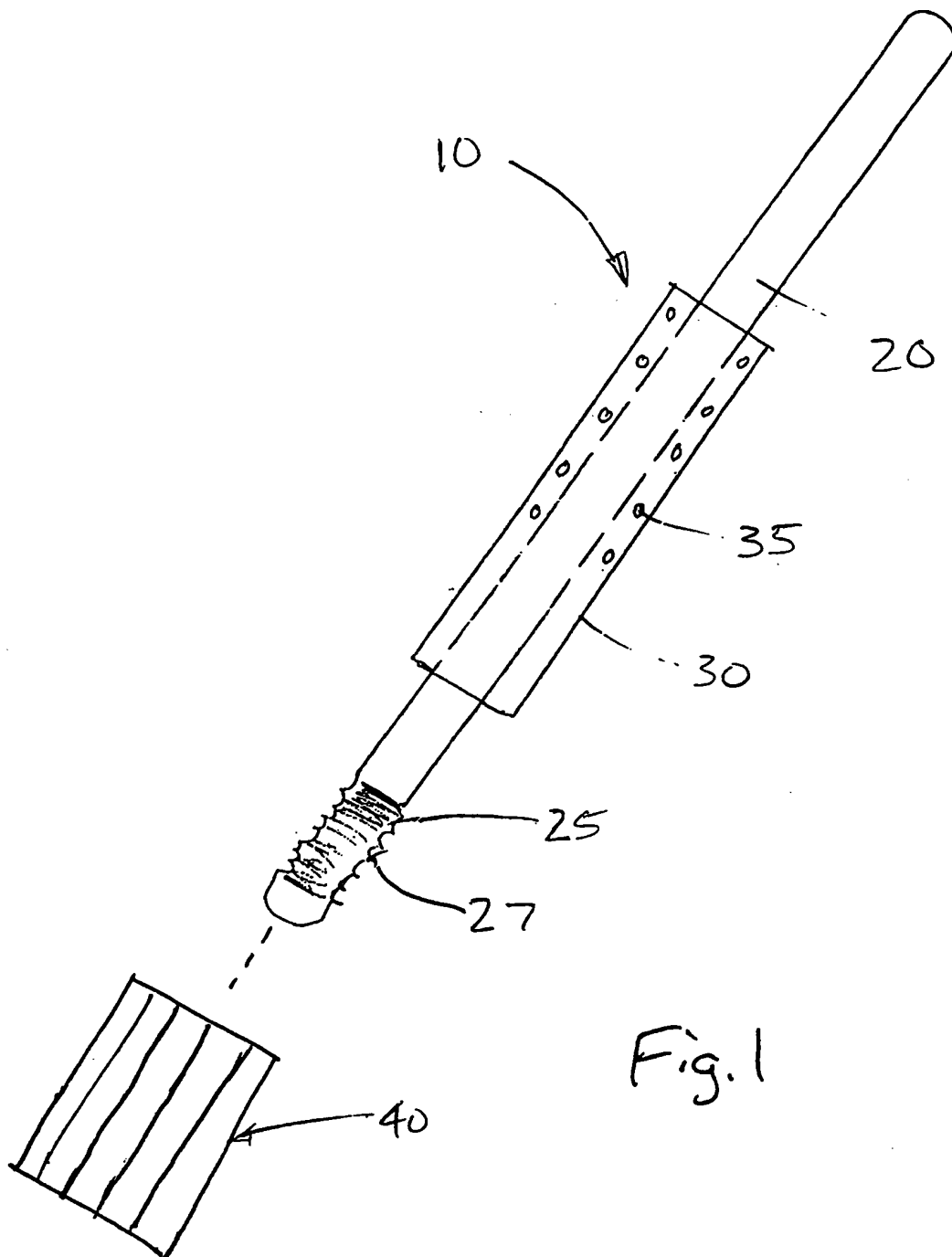
CLAIMS

1. A cleaning device, comprising:  
a handle; and  
a disposable cleaning head adapted to be engageable  
with the handle, the cleaning head comprising:  
an inner core dissolvable in water; and  
a cleaning layer attached to the outer core and  
being dissolvable in water,  
wherein the inner core dissolves more rapidly  
than the cleaning layer.
2. The cleaning device of claims 1, comprising an  
ejector for displacing the cleaning head forwardly  
relative to the handle to eject the cleaning head  
from the handle.
3. The cleaning device of claim 2 wherein the ejector  
is reciprocally axially displaceable relative to the  
handle.
4. The cleaning device of claim 3 comprising a biasing  
element for biasing the ejector rearwardly away from  
the cleaning head.
5. The cleaning device of claim 1 wherein the core has  
substantially cylindrical interior cavity and the

handle comprises a mounting stem configured to cooperate with the interior cavity of the core.

6. The cleaning device of claim 5 wherein the stem comprises a plurality of circumferential ribs axially spaced from one another.
7. The cleaning device of claim 6 wherein the outer diameter of the circumferential ribs is greater than the diameter of the core interior cavity.
8. The cleaning device of claim 7 wherein the ribs engage the core to substantially prevent removal of the cleaning head from the stem while the cleaning head is dry.
9. The cleaning device of claim 8 wherein wetting the cleaning head causes the core to become sufficiently pliable to allow removal of the cleaning head from the stem.
10. The cleaning device of claim 1 comprising a one-way lock for substantially impeding axial displacement of the cleaning head relative to the handle while the cleaning head is dry.

11. The cleaning device of claim 1 wherein the cleaning layer comprises one of cellulose, paper pulp, lignin and vegetable oil.
12. A cleaning device, comprising:
  - a handle having ratchet elements;
  - a disposable cleaning head being adapted to be engageable with the handle, and being formed of a water-soluble material;wherein the ratchet elements afford ready engagement between the handle and the cleaning head and substantially impeding disengagement of the head from the handle when the cleaning head is dry.
13. The cleaning device of claim 12 wherein the ratchet elements permit the cleaning head to be readily disengaged from the handle when the cleaning head is wet.



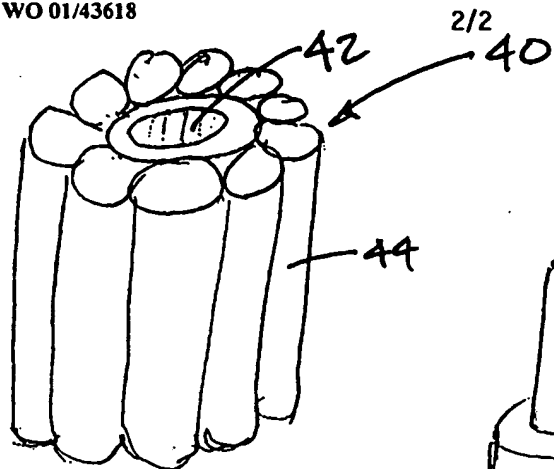


Fig. 2

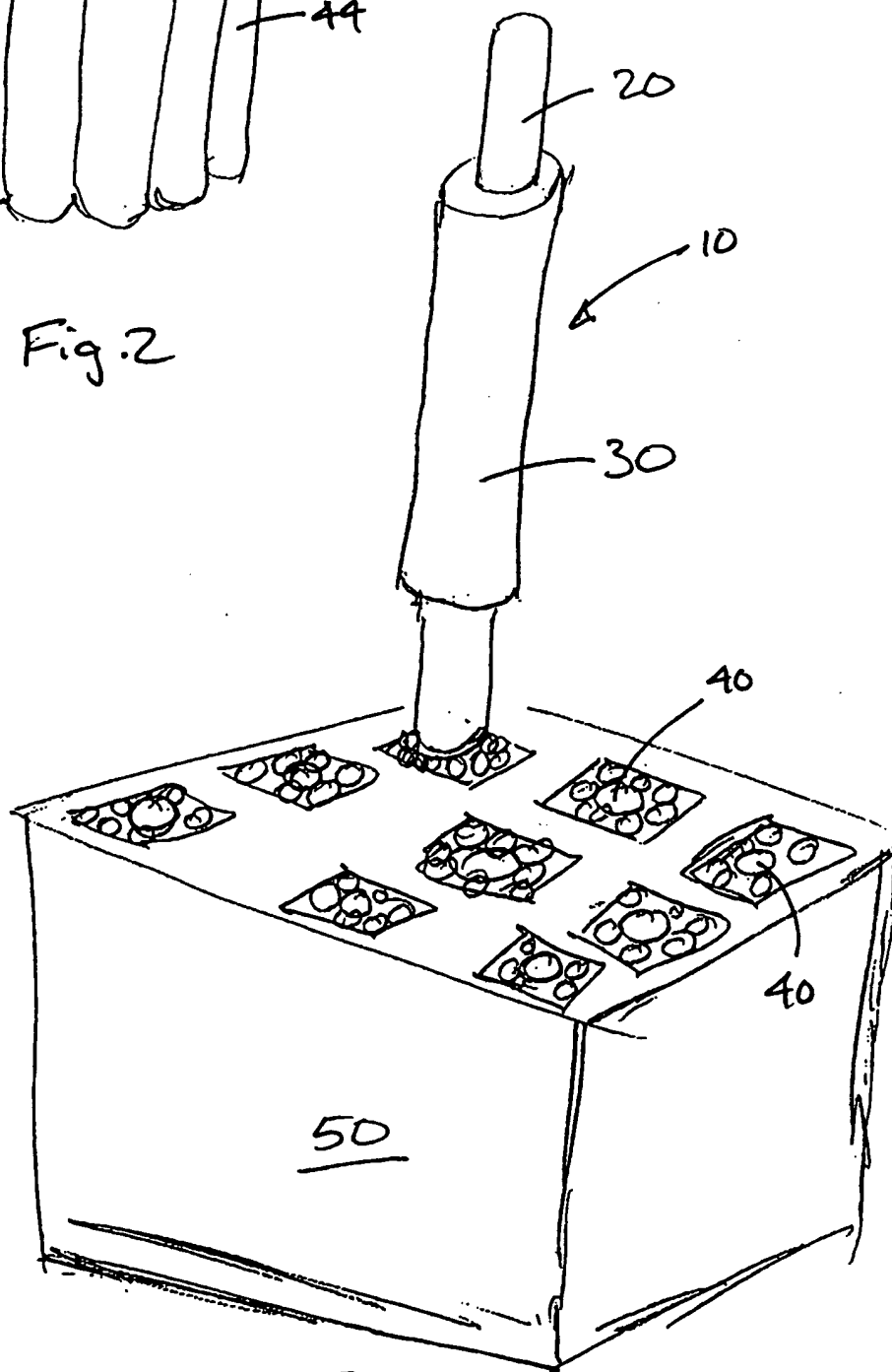


Fig. 3

# INTERNATIONAL SEARCH REPORT

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## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : A47L 25/00

US CL : 15/210.1, 104.94

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 15/210.1, 104.94

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2,610,347 A (KLEINER) 16 September 1952, see entire document.	
A	US 2,816,312 A (BECK et al) 17 December 1957, see entire document.	
X	US 3,383,158 A (LELAND) 14 May 1968, see entire document.	1-3, 11
X	US 5,471,697 A (DACONTA) 05 December 1995, see entire document.	1,5,6, 10-13
Y		7-9

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
*A* document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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